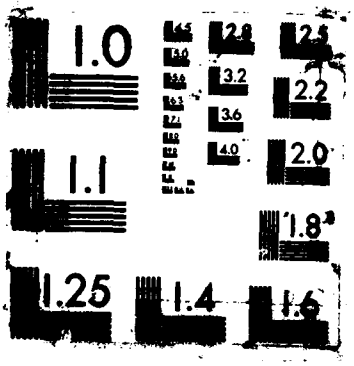
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US Army Corps
of Engineers
St. Paul District

AD-A187 189

EMERGENCY WATER PLANNING (EWP)

MINNESOTA INVENTORY

ASSUMPTIONS

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The St. Paul District has completed an inventory of information concerning Minnesota's water supply systems. This system is intended to provide a basis of information for meaningful management of scarce resources during national emergencies, such as mobilization for war, or recovery from a large scale natural disaster. Support resources include chemicals, equipment, energy, trained personnel, and any other resource required to supply water to Minnesota's residents, industry and agriculture.

The electronic database is designed to allow quick queries of pertinent data items concerning water use, water availability, existing emergency management network, and support resource demand in Minnesota. The EWP uses an IBM-PC compatible personal computer with DBASE III software. keywords:

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EMERGENCY WATER PLANNING (EWP)

MINNESOTA INVENTORY ASSUMPTIONS

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SEPTEMBER 1987

EMERGENCY WATER PLANNING (EWP)

MINNESOTA INVENTORY ASSUMPTIONS

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EMERGENCY WATER PLANNING (EWP)
MINNESOTA INVENTORY ASSUMPTIONS

AUTHORITY

The St. Paul District has completed an inventory of information concerning Minnesota's water supply systems. This inventory was completed as part of a nationwide Corps of Engineers program in response to Executive Order 11980. In EO 11980, the President assigned the responsibility for emergency planning and management for our Nation's water supply system to the Corps of Engineers. The Office of the Chief of Engineers (OCE) has developed guidance for an electronic database structure and related written requirements toward that objective.

In EO 11980, other Federal agencies have also been systematically assigned similar planning and management responsibilities for other types of national resources. This system is intended to provide a basis of information for meaningful management of scarce resources during national emergencies, such as mobilization for war, or for recovery from a large scale natural disaster.

PURPOSE OF DATABASE

The primary purpose of the database inventory is to support the St. Paul District's role in managing scarce water support resources during a national or natural emergency that affects Minnesota's water supply systems. Support resources include the chemicals, equipment, energy, trained personnel, and any other resource required to supply water to Minnesota's residents, industry, and agriculture. Corps involvement in such resource management would occur only after the President or Congress directed the Corps of Engineers to become involved. In such a nationally declared emergency, the Corps would help allocate the support resources in addition to the other, more traditional, emergency management roles of the Corps of Engineers.

The electronic database is designed to allow quick queries of pertinent data items concerning water use, water availability, existing emergency management network, and support resource demand in Minnesota. With such information available, the State and Federal emergency management people could make more informed decisions about water supply resource management, particularly during an emergency of national scope.

DESCRIPTION OF ELECTRONIC DATABASE

The EWP database uses an IBM-PC compatible personal computer with DBASE III PLUS software. DBASE III PLUS is a commercially available software package that allows systematic archival, query, and retrieval (printed report) of vast amounts of data.

Only those data items that were readily available from existing data sources were inventoried in this effort. Future work may be accomplished by the Corps to further complete or maintain the database.

Certain assumptions were necessary in adapting the available information into OCE's nationally standardized database format. Regional variations exist as to how water supply utilities and related recordkeeping systems are established. The assumptions used for this inventory are summarized in following sections.

TECHNICAL SPECIFICATIONS FOR USE OF ELECTRONIC DATABASE

Equipment Needed:

IBM-PC compatible personal computer
- Hard disk (memory) with at least 10 Megabytes available
- At least one 5.25-inch floppy disk drive
- Printer (optional, but very useful)

DBASE III PLUS Software and Manual

MS-DOS Version 3 Disk Operating Software

DSBACKUP Version 2.4 Software and Manual

Procedure:

1. Load the EWP programs on the hard disk in the same directory area with the DBASE III PLUS software.

2. Use DSBACKUP 2.4 to load the several floppy disks of Minnesota inventory data onto the hard disk in the same directory area with the DBASE III PLUS software.

3. Enter DBASE <CR> to initiate DBASE III PLUS software. Enter DO EWP at the dot prompt of the DBASE III PLUS software.

4. Follow the menu selections and screen entry directions to review the data in the various database areas.

5. Query and reporting from the Minnesota Inventory require a fairly detailed understanding of the DBASE III PLUS commands. The software does provide for very complicated data searches and reports using multiple screening criteria. Use the DBASE III PLUS manual to determine how to do queries and reports.

If you would like a copy of the data and EWP programs, or if you have a specific data query problem, contact the Emergency Management Division at telephone (612) 725-7606.

DATABASE ASSUMPTIONS

ASSUMPTIONS FOR WATER AGREEMENTS (MNWATAGR.DBF)

The primary source of information for this database is a research product prepared by a contractor for the St. Paul District. The contractor obtained information concerning Treaties and Protocols with Great Britain and Canada, the International Joint Commission (IJC) and its subcommittees and work groups, Indian Nations, the Minnesota

Department of Natural Resources (MDNR) permit and water allocation systems, Minnesota Department of Health well inspection and approval requirements, rural water user districts, and watershed districts.

Information contained in specific database fields is described below.

REC_NUM A random 5-digit code for order of entry into the database.

AGREE_DATE Date that each agreement became effective. Any specific expiration date would be included in the REFERENCE memo field.

HYDRO_UNIT The U.S. Geological Survey (USGS) code for the hydrologic unit that is affected by the agreement. Where more than one unit number area is affected by a particular agreement, then several records may have been made or a less precise unit code used. For example, an international agreement that affects the entire Red River of the North basin in Minnesota would be assigned a hydrologic unit code of 09020. Some agreements affect the entire State and thus must be assigned to several codes, including some very general ones such as 070 or 090. For some water agreements, a hydrologic unit map for Minnesota is needed to make a logical search. See the WATERSHED field for more hints on doing a thorough query. When doing a database search that uses only the first few characters of the hydrologic unit number, a DBASE III PLUS command something like the following (or a variation of the 'Left' function) must be used: DISPLAY ALL FOR LEFT(HYDRO_UNIT,3)="090"

WATERSHED Contains the name of the river or lake affected by the agreement. Many boundary waters and Indian Reservation water bodies are displayed on an individual basis in this field. In the case of Statewide effect, the field contains: ENTIRE STATE.

REFERENCE Contains an abstract of the agreement, extent of its effect, waiver conditions, and other pertinent information in concise format to assist a relatively inexperienced (in legal and hydrologic subjects) emergency management decision-maker.

ASSUMPTIONS FOR ALTERNATIVE WATER SOURCES (MNALTSRC.DBF)

Literally thousands of water sources in Minnesota remain relatively unused because of the widespread availability of aquifers and surface bodies in the State. There are sources convenient to large populations that are avoided because of particular water quality or other problems. However, many more alternative surface water sources in Minnesota are unused merely because they are inconveniently located.

Many alternative aquifer sources are unused or underused because their extent is unknown. Ongoing aquifer mapping efforts by the Minnesota Department of Natural Resources (MDNR) indicate many large aquifers of potentially high quality have been largely undiscovered. Many of the unknown aquifers have been undeveloped mainly because of the availability of shallower aquifers.

The U.S. Geological Survey (USGS) and MDNR have several electronic databases that contain various types of information about surface water and groundwater sources. However, the study team has been unable to develop satisfactory criteria for screening the huge volumes of information. It was determined that, at this stage of the Corps' emergency water program for Minnesota, the resources for this inventory would be better spent on other aspects of the database. Thus, the XXALTSRC.DBF database was left unfilled.

ASSUMPTIONS FOR MAJOR SUPPLIERS OF WATER SUPPORT RESOURCES (MNMAJSUP.DBF)

The sources of this information are the Thomas Register of Businesses in electronic format, the 1986-1987 Minnesota Directory of Manufacturers published by the National Information Systems, Inc., and the 1986-1987 Minnesota Business Directory. The Minnesota Business Directory is published by the American Directory Publishing Co., Inc. and is a compilation of Yellow Pages advertisers from all Minnesota telephone

directories. The Minnesota Business Directory information is available in written report form and non-interactive electronic format. The Standard Industrial Codes (SIC) were identified for specific classes of support resources. In the event of a future emergency, such that this portion of the database might be outdated, the identified SIC codes could be used to do a quick search of the interactive electronic Thomas Register at that time. The 3-digit SIC code was used for this database, but a 4-digit code might prove to be more succinct for database work.

ASSUMPTIONS FOR MUNICIPAL WATER USE (MNMUNPUR.DBF)

This information is taken from Minnesota Department of Natural Resources (MDNR) figures for permitted municipal and mobile home park (MHP) water use in 1984.

The following paragraphs describe how the municipal water use figures were determined. The descriptions are taken from the U.S. Geological Survey (USGS) Investigations Report 85-4306, titled Development of a Water-Use Data System in Minnesota, prepared in cooperation with the Minnesota Department of Natural Resources and the Minnesota State Planning Agency.

> Municipal use or public supply refers to water withdrawn by public and private water suppliers and delivered to a variety of users for domestic or household use, public use, industrial use, and commercial use (Solley of USGS and others, 1983).
>
> Estimates of municipal water use were made using a list from the Minnesota Department of Health (MDH) of (1) all municipalities in the State that have their own water supply, (2) the population served, and (3) the percent of municipal water supplied to commerce and industry. Initial estimates were made using the following formula:

$$\text{Municipal use (million gallons)} = \frac{\text{population served X 100 gal/capita/day}}{\text{1,000,000 gal/Mgal (1 - \% indust. \& comm)}}$$

For example, the water use for a municipality serving 50,000 people, of which 18 percent was supplied to commerce and industry, would be (100 gal/day X 50,000)/(1,000,000(1.00-0.18)) = 6.1 Mgal/day. A value of 100 gallons per capita was used to represent not only consumption per person, but also line loss, fire fighting, city sanitation, and city recreational use. This value compared favorably with municipalities where total use and industrial and commercial use were known. An estimate of 15 percent (Minnesota Department of Health written communication, 1981) was used when the percent of water supplied to commerce or industry was not provided.

The municipal water use estimates were checked against any previously reported use figures for that municipality. If the previously reported figure was within 10 percent of the computed value, then the previously reported figure was used. This method provides both a complete list of potential users and a systematic method for estimating use.

Information contained in specific database fields is described below.

REC_NUM The right 5 digits of the 6 digit permit number from the MDNR. It is possible that more than one permit number may have been issued to a single municipal water utility. In that case, only one of the numbers was used as REC_NUM for the record.

OTHER_USE Volume of water used in million gallons per day (MGD) by commerce and industry; the figure is computed by multiplying the MDNR MUNPERCENT field times the total annual permitted withdrawal divided by 365 days. MDNR and USGS assume 15 percent of total usage is commercial and industrial if the permittee does not report a figure.

COUNTY1 County location of the municipality or mobile home park (MHP).

CNTY_CODE1 Federal 3 digit county code for COUNTY1.

MAJCITY1 Used to display number of service connections; COUNTY2 is also used as part of the screen labeling for service connections.

SMSA Standard metro statistical area or NONE if it is not located in an identified SMSA.

AQ_SRCE1 thru AQ_SRCE4 and STR_SRCE1 thru STR_SRCE4 Source aquifer name from either the MDNR database or the MDH report.

WELL_NUM1 thru WELL_NUM4 and STR_NUM1 thru STR_NUM4 Number of wells associated with a particular MDNR permit number. Some municipalities hold more than one permit number.

AQ_YIELD1 thru AQ_YIELD4 and STR_YIELD1 thru STR_YIELD4 Yield information is intended to reflect the hydrologic availability of water from the source medium. Unfortunately, none of the available databases contain hydrologic yield information. Thus, the largest of the various withdrawal figures available for each community is used to provide a general indicator of yield. Note that the actual hydrologic availability of water from the source may in fact be much greater than the figure displayed in these database fields. The displayed yield figures are either well capacities, based on MDNR permitted pumping rate, or if no pumping rate was provided, then the annual permitted volume divided by 365 days. The design capacity figure from the MDH report is used for some communities, if that figure is largest. Unfortunately, this figure should be the same as AVE_PKUSE for each community, so it normally provides redundant information. The yield figures displayed in the database are zero for many smaller communities because of rounding to tenths of million gallons per day.

WELL_UNIT1 thru WELL_UNIT4 and STR_UNIT1 thru STR_UNIT4 Hydrologic unit identifiers from the USGS hydrologic unit map for Minnesota. The concept of hydrologic unit parallels drainage basin delineation, not the layers of an aquifer unit.

POP_SERVED Population served in each municipality or MHP; larger figure from either the MDNR database or the MDH report.

AV_DAYUSE Total permitted volume from the MDNR database or the Average Daily Production figure from the MDH report, whichever is greater. This figure is displayed as zero in the database for many smaller communities because of rounding to tenths of MGD.

AV_PKUSE The MDNR database PUMPRATE was used, if provided, to compute an approximate of peak use. Otherwise, the design capacity figure or pump capacity figure was used, as available, from the MDH report, if that figure is largest.

EM_NAME and the other emergency contact information is for the 24-hour duty officer at the Minnesota Division of Emergency Services (MDES). MDES prefers to be the first contact point for Corps initiated coordination concerning EWP matters in Minnesota. Because this database concerns municipal facilities, the local civil defense and MDES officials need to be aware of emergency management activities in their jurisdiction. In an emergency, the municipal contact person's name and telephone number normally accompany the request for assistance. This is true whether the request would come directly to the Corps or through State channels. If the Corps manager needs clarification for a particular assistance request, then the municipal representative could be contacted directly. This assumption also minimizes the Corps' EWP database maintenance requirements because only one contact needs verification, compared to hundreds of local or county contacts. MDES currently maintains the local contact list for their own use.

ASSUMPTIONS FOR AGRICULTURAL PURVEYORS (MNAGRPUR.DBF)

Agricultural purveyors could be established in Minnesota, but would need to obtain a water use permit from the Minnesota Department f Natural Resources (MDNR). No agricultural purveyors were identified in the MDNR water use database for 1984. Thus, apparently no such organization exists in Minnesota at this time, and as a result, the EWP inventory database, MNAGRPUR.DBF, is empty.

Groundwater is widely available in Minnesota, so that most irrigation systems are based on the center pivot or other similar well-based system. Livestock watering is generally accomplished with wells or dug pits. Thus, there is limited need for centralized large-scale agricultural water supply systems.

ASSUMPTIONS FOR INDUSTRIES SUPPLIED BY OTHERS (MNSUPIND.DBF)

There are several listings of industries in Minnesota, including the "Minnesota Directory of Manufacturers, 1986-1987" by National Information Systems, Inc. and the "1986-1987 Minnesota Business Directory" compiled from the Yellow Pages by the American Directory Publishing Co., Inc. The lists are extensive and would require significant resources to enter into the database. However, many of the more important data items, such as water use figures, emergency agreements, and emergency contacts, are not available in any existing database that we could locate.

The industries that are supplied by municipalities typically use very little water in their production processes. For most municipalities, the commercial and industrial water use is represented by an actual reported percentage or 15 percent when no figure was reported. The U.S. Geological Survey and the Minnesota Department of Natural Resources have administratively agreed to use the 15 percent figure for Minnesota municipalities that do not report a figure. Most of the low water use

industries could probably function close to capacity in water supply emergencies with delivery of drinking water to the employees.

Another consideration is that the industries that use large amounts of water for production processes will typically develop their own supplies to minimize costs. The information about self-supplied industries (large water use industries) is contained in MNSLFIND.DBF. Based on these considerations, the study team determined that MNSUPIND.DBF is low priority, and the study resources were used to complete higher priority segments of the inventory.

ASSUMPTIONS FOR SELF-SUPPLIED FEDERAL FACILITIES (MNSLFDEF.DBF)

The self-supplied Federal facilities in Minnesota hold water use permits from the Minnesota Department of Natural Resources (MDNR). As a result, the MDNR water use database for 1984 contains information concerning the self-supplied Federal facilities.

Information contained in specific database fields is described below.

REC_NUM is the right 5 characters of the 6-digit MDNR permit number. It is possible that more than one permit number may be issued to a single facility. In that case, only one of the numbers is used for the REC_NUM used for a given facility.

Addresses and telephone numbers were obtained from the MDNR database, as available, or from current directories.

RES-SERVED is POPSERVE from the MDNR database.

EM_NAME and the other emergency contact information is for the 24-hour duty officer at the Minnesota Division of Emergency Services (MDES). MDES prefers to be the first contact point for Corps initiated coordination concerning EWP matters in Minnesota. While this database concerns Federal facilities, the local civil defense and MDES officials

need to be aware of emergency management activities in their jurisdiction. In an emergency, the Federal contact person's name and telephone number normally accompany the request for assistance. This is true whether the request would come directly to the Corps or through State channels. If the Corps manager needs clarification for a particular assistance request, then the Federal facility representative could be contacted directly. This assumption also minimizes the Corps' EWP database maintenance requirements because only one contact needs verification, compared to hundreds of local or Federal facility contacts. MDES currently maintains the local contact list for their own use. The installation contact information mentioned for previous data fields also provides contact points that could be used in emergencies, particularly at the St. Paul District's mobilization facilities assignments.

AV_DAYUSE is the total annual permitted volume (MGY), as stated in the MDNR database, divided by 365 days per year to million gallons per day (MGD).

AV_PKUSE is computed from the permitted pump rate from the MDNR database converted to a daily value, in MGD (GPM X 24 hours). The assumption is that the permitted pump rate is a better estimation of the theoretical physical and/or legal maximum flow of the system. Past reports of average peak withdrawals are not available in the MDNR database and may not adequately reflect demand during future emergencies. Generally, the permitted pump rate, if delivered for a year, would withdraw far more than the MDNR's total annual permitted volume for a given permittee.

AQ_SRCE and STR_SRCE are the resource names (RESCNAME) from the MDNR database, if available. General terms such as groundwater, slough, or dug pit may have been used, based on the RESOURCE code reported in the MDNR database, if RESCNAME was blank in the MDNR database.

AQ_YIELD and STR_YIELD, in MGD, were computed from the MDNR permitted

pump rate (pump rate X 0.00144). If the permitted pump rate was reported as zero in the MDNR database, then a daily figure was computed from the total annual permitted volume for each permittee (TOTAPPROP / 365).

ASSUMPTIONS FOR SELF-SUPPLIED INDUSTRIAL WATER USE (XXSLFIND.DBF)

The information in this database is taken from the Minnesota Department of Natural Resources (MDNR) database for the agency's water use permit system. The database includes water uses identified to include, but not limited to, steel, chemical and allied products, paper and allied products, mining, petroleum refining, and thermoelectric power generation. This database also includes the water used by municipalities in their wastewater treatment facilities.

According to the U.S. Geological Survey (USGS) and MDNR handbook for their water use database, this category is probably the least dependable portion of this State inventory because many industries are reluctant to accurately report water withdrawals, use, and discharge. Recent findings concerning industrial waste and contamination have made many industries protective of such information. A compounding factor is that this type of water use is not as visible as other types of water use.

Information contained in specific database fields is described below.

REC_NUM is the right 5 digits of the 6-digit MDNR permit number. It is possible that more than one permit has been issued to one industrial facility. In that case, only one of the numbers is used as a REC_NUM.

SYS_NAME is the MDNR PERMHOLDER field reduced from 30 characters wide to the left 20 characters.

SIC_CODE1 is the left 3 digits of the 4-digit MDNR SIC.

Address and telephone information is taken from the MDNR database, if available, or from the "Minnesota Directory of Manufacturers 1986-1987", published by the National Information Systems, Inc.

SMSA were assigned to Minnesota counties as follows:

5120 Anoka, Carver, Wrignt, Chisago, Ramsey, Dakota, Scott, Hennepin, Washington, Isanti
6820 Olmsted
2240 St. Louis
2520 Clay
6980 Benton, Sherburne, Stearns

AV_DAYUSE is the MDNR total annual permitted appropriation divided by 365 days per year.

AV_PKUSE is computed from the permitted pump rate from the MDNR database converted to a daily value, in million gallons per day (MGD), (GPM X 24 hours). The assumption is that the permitted pump rate is a better estimation of the theoretical physical and/or legal maximum flow of the system. Past reports of average peak withdrawals are not available in the MDNR database and may not adequately reflect demand during future emergencies. Generally, the permitted pump rate, if delivered for a year, would withdraw far more than the MDNR's total annual permitted volume for a given permittee.

WELL_NUM and STR_NUM are the MDNR number of installations (NUMINSTALL) for all active permits for the industry.

AQ_SRCE and STR_SRCE are the resource names (RESCNAME) from the MDNR database, if available. General terms such as groundwater, slough, or dug pit may have been used, based on the RESOURCE code reported in the MDNR database, if RESCNAME was blank in the MDNR database.

EM_NAME and the other emergency contact information is for the 24-hour duty officer at the Minnesota Division of Emergency Services (MDES). MDES prefers to be the first contact point for Corps initiated coordination concerning EWP matters in Minnesota. While this database concerns industrial facilities, the local civil defense and MDES officials need to be aware of emergency management activities in their jurisdiction. In an emergency, the industrial facility person's name and telephone number normally accompany the request for assistance. If the Corps manager needs clarification for a particular assistance request, then the industrial facility representative could be contacted directly. This assumption also minimizes the Corps' EWP database maintenance requirements because only one contact needs verification, compared to thousands of local or industrial facility contacts. MDES currently maintains the local contact list for their own use.

ASSUMPTIONS FOR RURAL DOMESTIC WATER USE (XXSLFRUR.DBF)

The information is taken from U.S. Geological Survey (USGS) estimates for 1984. The county summary figures were computed by multiplying the non-publicly supplied population in each county by 88 gallons per day.

Information contained in specific database fields is described below.

REC_STATE	MN for Minnesota
REC_DISTRT	NCS North Central Division, St. Paul District
REC_NUM	27 for MN, plus the 3-digit county code
CNTY_CODE	3-digit county code
POPULATION	CNTY_USE divided by 88 gal/day/capita
CAPITA_USE	88 gal/day/capita as developed by USGS and MN DNR

CNTY_USE Figure supplied by USGS

EM_NAME and the other emergency contact information is for the 24-hour duty officer at the Minnesota Division of Emergency Services (MDES). MDES prefers to be the first contact point for Corps initiated coordination concerning EWP matters in Minnesota. Because this database concerns county summaries of rural water use, the local civil defense and MDES officials need to be aware of emergency management activities in their jurisdiction. In an emergency, the county contact person's name and telephone number are likely to accompany the request for assistance. This is true whether the request would come directly to the Corps or through State channels. If the Corps manager needs clarification for a particular assistance request, then the county representative could be contacted directly. This assumption also minimizes the Corps' EWP database maintenance requirements because only one contact needs verification, compared to hundreds of local or Federal facility contacts. MDES currently maintains the local contact list for their own use.

ASSUMPTIONS FOR AGRICULTURAL WATER USE (MNSLFAGR.DBF)

This information is taken from U.S. Geological Survey (USGS) figures for livestock water use in 1985 and Minnesota Department of Natural Resources (MDNR) figures for permitted irrigation in 1984. The livestock figures were developed in conjunction with the Minnesota Department of Agriculture. The figures were computed by multiplying estimated populations of livestock in each county by the amount of water that is required to raise each particular species of animal:

milk cow	20.00 gals/day	(Figures are taken from a
other cattle	10.00 gals/day	report by the Minnesota
hog	3.00 gals/day	Crop and Livestock
sheep	2.00 gals/day	Reporting Service, 1980)
chicken	0.04 gal/day	

It was estimated by USGS that 15 percent of water used by livestock was from surface water and 85 percent was groundwater.

The irrigation water use figures are taken from the MDNR water use permit system as of 1984. It is estimated by MDNR, from preliminary field reconnaissance, that about 10 percent of the total irrigators are unpermitted. Thus, the reported figures account for about 90 percent of the actual irrigation use.

Information contained in specific database fields is described below.

REC_NUM 27 for Minnesota and the Federal 3-digit county code.

ANN_STOCK Figure taken from USGS.

IRR_WELLS Number of permitted wells as taken from MDNR.

SUR_WDRAWL Maximum annual water volume that could be withdrawn in each county according to the 1984 MDNR database. The 1984 reported figures were entered into a memo field (USE1984) that the District added to the EWP database for each county.

TOT_ACIRR Total acres specified in the MDNR permits for each county.

ANNSUR_IRR Total permitted volume of withdrawals identified as coming from a surface source in 1984. The 1984 reported figures were entered into a memo field (USE1984) that the District added to the EWP database.

ANNGRD_IRR Total permitted volume of withdrawals identified as coming from a well in 1984. Tne 1984 reported figures were entered into a memo field (USE1984) that the District added to tne EWP database.

STOCKWELLS Blank because these are not estimated by USGS or MDNR.

CROPTYPE1-5 MDNR codes crop types into: row, field, specialty (berries and truck farm), canning (corn, peas, beans), non-crop (golf, cemeteries, orchards) and unspecified crop use.

CROPTYPE1-5 Row and field crop types were identified as food production related (either for livestock or direct human consumption); canning and specialty crops were identified as food (direct human consumption); non-crop was identified as commercial irrigation use; unspecified was identified as unspecific crop type.

ACIRRCROP1-5 Total permitted acres in each county for each crop type.

IRRWTCROP1-5 Total permitted annual water volume use in each county for each crop type. Note that the 1984 reported figures were entered into a memo field (USE1984) that the District added to the EWP database.

EM_NAME and the other emergency contact information is for the 24-hour duty officer at the Minnesota Division of Emergency Services (MDES). MDES prefers to be the first contact point for Corps initiated coordination concerning EWP matters in Minnesota. While this database concerns summaries of agricultural water use, the local civil defense and MDES officials need to be aware of emergency management activities in their jurisdiction. In an emergency, the county contact person's name and telephone number normally accompany the request for assistance. This is true whether the request would come directly to the Corps or through State channels. If the Corps manager needs clarification for a particular assistance request, then the county representative could be contacted directly. This assumption also minimizes the Corps' EWP database maintenance requirements because only one contact needs verification, compared to hundreds of local contacts. MDES currently maintains the local contact list for their own use.

ASSUMPTIONS FOR WATER SUPPLY SUPPORT RESOURCES AND WASTEWATER TREATMENT SUPPORT RESOURCES (Including the databases named: XXSCHEM.DBF, XXSEQUIP.DBF, XXSSTOR.DBF, XXWCHEM.DBF, XXSPERSN.DBF, XXWPERSN.DBF, XXWEQUIP.DBF)

This information was obtained by a survey mailed to a number of water utilities in Minnesota. The utilities were selected based on population size specified in the inventory guidance and for geographic variance. It is uncertain how representative this information might be for the other water utilities in Minnesota that were not surveyed. For example, the raw groundwater available in the western part of tne State is often highly alkaline. Residents of those areas may be more willing to tolerate nigh alkalinity levels than, say, residents who are accustomed to other, less alkaline, supplies. Residents' acquired "tastes" for water may significantly affect the normal water treatment process. However, it is difficult to predict residents' reaction to water taste and quality under emergency conditions. Thus, this limited information should not be used to infer rate of chemical usage for all Minnesota utilities under all conditions. Some adjustments may be needed for assumed conditions.

Information contained in specific database fields is described below.

REC_NUM A random 5-digit code for order of entry into the database.

SUR_CITY, SUR_CONTAC, SUR_PHONE, SUR_STREET, etc. were obtained from the surveyed water utilities.

POP_SERVED was obtained from the water utilities.

The figures received from the utilities for resources used were entered in the database exactly as received, except when conversion to proper units of measurement was required. The study team did not impose assumptions beyond those that may nave been used by the utility managers that completed the survey.

ASSUMPTIONS FOR SUPPLIED FEDERAL FACILITIES (MNSUPDEF.DBF)

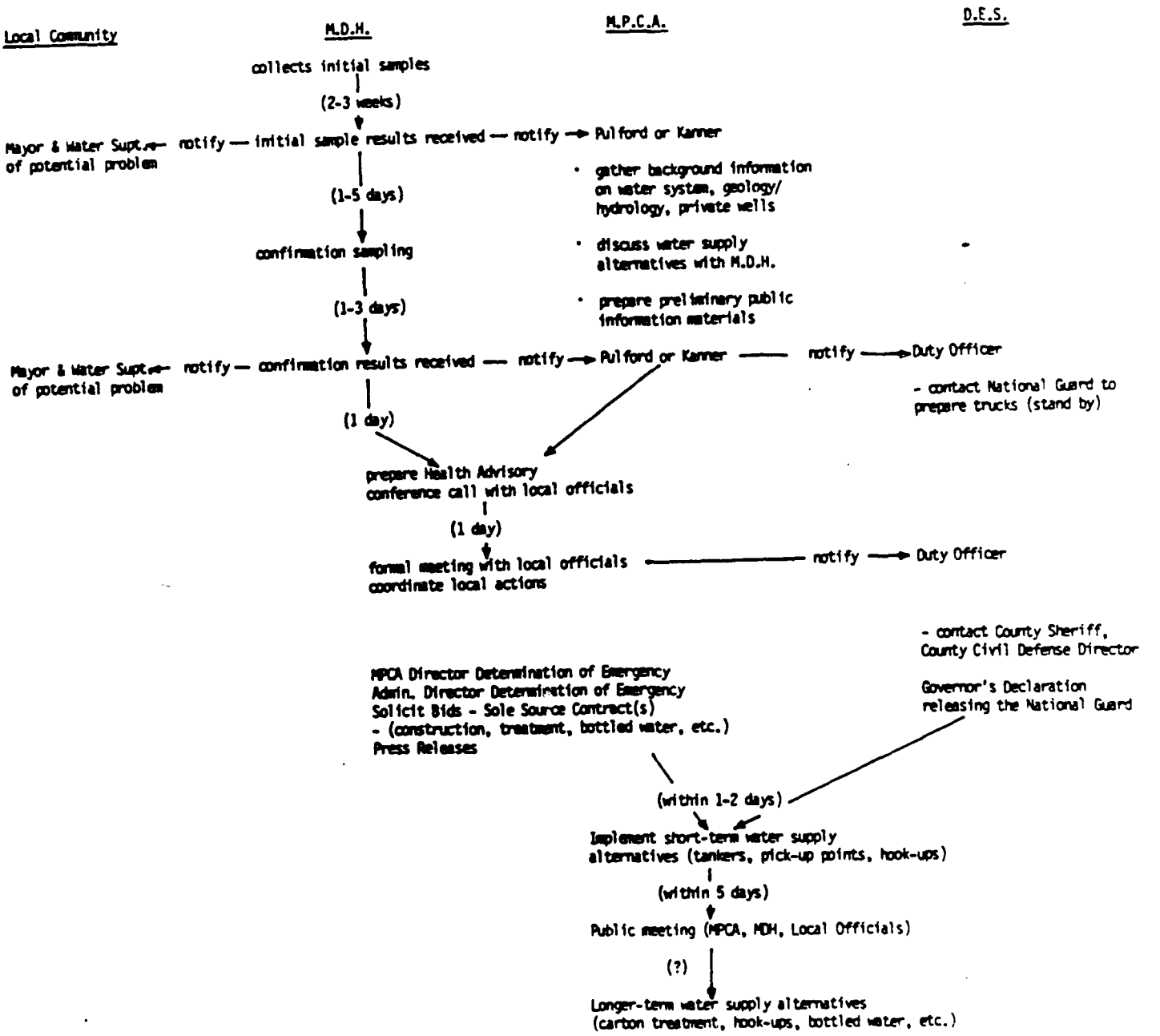
The primary sources of information for this database were telephone directories from the larger cities and the "1987-1988 Minnesota Business Directory," published by the American Directory Publishing Co., Inc. These directories provided the facility names, addresses, and telephone numbers. No existing source of information was available containing water use, emergency preparedness, or any of the other more specific information fields of the database. A direct mailing of a questionnaire would likely be the most efficient way of completing this database.

OTHER INVENTORY PRODUCTS

OCE guidance for this inventory also requires submission of a diagram(s) showing the lines of communication used in each State in the event of a water supply emergency. The diagrams are included starting on page 21.

The St. Paul District hired a contractor to complete legal and institutional research to support the water agreements and emergency coordination diagrams. The contractor's product, dated September 1987, is organized in two volumes. Volume 1 contains abstracts of and commentary on treaties, legislation, and rules concerning water availability in Minnesota. Volume 2 contains photocopies of the pertinent treaties, legislation, and other included water agreement sections. Limited numbers of Volume 1 are available from the St. Paul District Office at telephone (612) 725-7606. Volume 1 will also be available from the National Technical Information Service (NTIS) in Springfield, Virginia, at telephone (703) 487-4650.

Water Supply Emergency Procedures



M.D.H. - Minnesota Department of Health (Gary Englund 623-5330, Richard Clark 623-5227)
M.P.C.A. - Minnesota Pollution Control Agency (Michael Kanner 296-7397, Gary Pulford 296-7290 or designated Project Leader)
D.E.S. - Department of Emergency Services (Duty Officer 778-0800)

END

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